# Ontario fish and wildlife Review

VOL. 20, No. 1

Ontario

MINISTRY OF NATURAL RESOURCES
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## Special Moosonee Issue

You may know of Moose Factory, but what's a great goose factory? Paul Prevett takes us to Cape Henrietta Maria, then on a year-long visit with a Cree hunting family.

"Have copter, will travel," could describe the C.O.s who patrol the great muskeg, as Pat Brown explains. And Officer Fred Johnson tells us how it feels to be kicked, nipped and winded by 2,000 angry geese that want nothing to do with him or his I. D. bands.

Bill Hutchison sketches the Lowland landscape, and Al Stewart recounts its wildlife management history. Two fisheries researchers recall the ones that got away, and Steve Anderson describes how the Cree give moose a good hiding.

*Front cover: Tobius Hunter on the Shagamu River. Photo by A. J. Stewart.*

*Back cover: Polar bears. Photo by F. Johnson.*

*Inside back cover: Aerial view of caribou herd. Photo by F. Johnson.*

# Ontario
# fish and wildlife
# Review

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*The goal of the Ministry of Natural Resources is to provide opportunities for outdoor recreation and resource development for the continuous social and economic benefit of the people of Ontario, and to administer, protect and conserve public lands and waters.*

Ministry of Natural Resources
Ontario

Hon. Alan W. Pope
Minister

W. T. Foster
Deputy Minister

## To our readers:

This is the final issue of *Fish and Wildlife Review.*

Later this fall, we'll be launching the Ministry of Natural Resources' new magazine, *Landmarks.* The funding for the new magazine has come largely out of the consolidation of this periodical with others in order that the Ministry can produce one publication devoted to coverage of all the resource activities within its scope.

As most of you know, the Ministry of Natural Resources has the responsibility not just for the fish and wildlife components of the province's resource base, but for the land and water itself, for forests, for minerals and for parks. It has long been our desire to produce a publication that would reflect the interdependence of all these areas, a publication that would appeal to all ministry interest groups, to the resource user and to the interested public as well.

The desire is about to become a reality. This fall will mark the publication of the first edition of *Landmarks,* a quarterly magazine that will feature stories and photo essays on all aspects of ministry and resource-related activities.

To the many loyal readers of and subscribers to *Fish and Wildlife Review,* we would like to offer *Landmarks* on a replacement basis. Though it will not have wildlife as its single focus, *Landmarks* will contain frequent fish and wildlife articles. When you receive your first copy, please indicate on the card provided whether or not you would like to continue on the mailing list. We hope that you will.

Thank you for your support of *Fish and Wildlife Review.* We hope you look forward to *Landmarks* as much as we do.

# EDITORIAL

## A challenge accepted, a commitment made

The challenge is to manage the natural resources of the largest of the ministry's 47 administrative districts. Established in 1973, Moosonee District covers 26 per cent of Ontario, stretching from Manitoba to Quebec and from the boreal forest to the salt waters of Hudson and James Bays. And this vast tract is administered by only 15 people.

The key that unlocks this northland to outsiders is the airplane, and even internal travel takes place largely in the sky. There is no road access to the district, and no road network within it to link the tiny, widely scattered communities. A single railway line spans the 299 kilometres between Cochrane and the town of Moosonee. But for many residents, large freighter canoes remain the most popular mode of travel. Only now, their traditional lines are embellished with modern outboard motors.

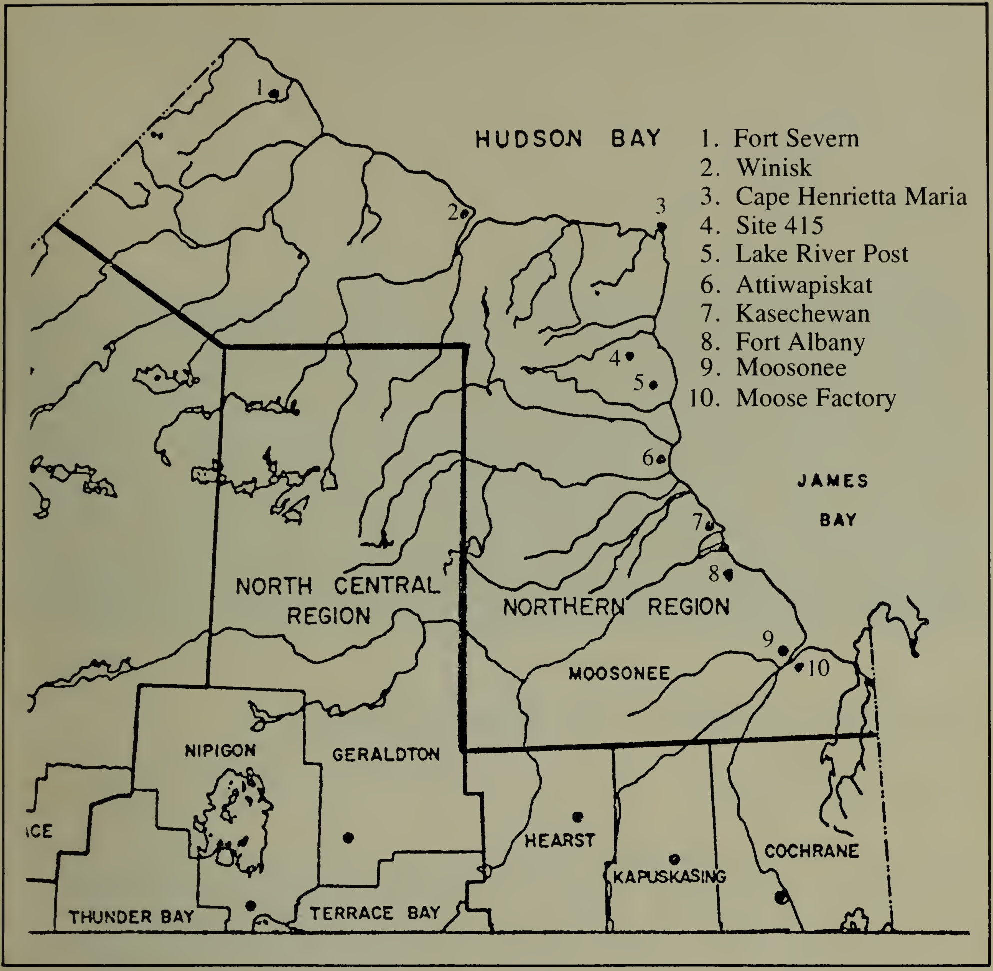
Such a blend of old and new is typical of Moosonee. This is a land of contrasts and surprises. There are polar bears that grow to 725 kilograms in less than 20 years, and black spruce that take nearly a century to stretch their trunks a single metre upward. Out of the flatness of the landscape, the Sutton Ridges arch a granite backbone almost 200 metres into the air. Rivers flood their banks in spring, and nearly dry up in summer. Tides float canoes onto shore but forget to come back and lift them off again. White whales swim up rivers in search of fish, while caribou stand at the ocean's edge to escape summer flies. Raptors wheel over tundra speckled with more than 9,000 plant species. The geese and other migratory birds that breed and stage here are of great local importance, and give pleasure to an entire continent. The waters and the land are alive with important fish and wildlife resources.

Beneath all this lies the largest peatland system of the northern hemisphere, and the tantalizing promise of oil and other minerals.

The people here offer surprises too. There are Cree children with quick, shy smiles, and weather-beaten Cree hunters roasting geese over open fires. There are spoken words that, when written down, look as strange to us as if they had come from another planet. Above all, there are signs everywhere of an ancient bond with the land, and of a very modern concern for the future of that land and its resources.

The Cree know they are straddling two worlds, striving to keep what is best in their own culture and traditions and to adapt to a constantly changing lifestyle that encroaches from the south. Like the landscape, the future the Cree envision takes contrasting forms. One vision is of loss—social upheaval, and the death of tradition and cultural pride. The other is of gain—the promise of mineral wealth and the prospect of increased tourism. If they are to realize the second and escape the first, the Cree must participate with ministry staff in the management of the land and its riches. Their desire to do so is increasingly voiced.

And thereby hangs our commitment. The Cree people's need to be involved in the planning of the future must be recognized by ministry staff and acknowledged in our actions. A land-use plan, now in its first stages, must combine the science of the modern world with the wisdom and practical knowledge of the people of Moosonee District.



## Moosonee District

*This modern structure houses the Moosonee District Office.*
*Photo by W. A. Hutchison.*

*One of the district's exotic inhabitants—the arctic fox. National Film Board of Canada photo.*

*A lonely snowmobiler among the stunted trees of a Lowland fen. Photo by A. J. Stewart.*

# The physiography of the Lowland

by W. A. Hutchison
*Senior Lands Technician*

MOOSONEE District encompasses most of the land mass of one of the country's most ecologically distinctive regions—the Hudson Bay Lowland. Here on this flat coastal plain to the west of Hudson and James Bays, there are few people and fewer developed areas. Yet this is a land of international fame and importance, for it is here that some of North America's most highly prized species of geese, ducks and shorebirds stage during migration, or nest and rear their young.

The geological events that created this excellent bird habitat began more than six billion years ago. During the Precambrian era, the Lowland was a mass of congealed volcanic rock and sediments. Later, molten granites forced their way between the cracks in these rocks and hardened there, forming a composite material called *gneiss*.

The long centuries of erosion that followed levelled these rugged Precambrian deposits to a gently undulating plain. Across this landscape swept the invading seas of the Paleozoic era. Again and again between 500 million and 225 million years ago, the retreating waters layered the plain with sand, clay and coral. This was slowly compressed into sedimentary rock that now lies beneath most of the Lowland's surface. Where rivers slice deeply into the overburden in the central part of the Lowland, dark grey sandstone and a yellow variety of limestone formed about 400 million years ago can still be seen.

The landscape changed but little until the Ice Age, when glacier after glacier warped the earth's crust downward from Hudson Bay all the way to the Great Lakes. The ice masses were thickest over the Lowland, the last of them towering 1500 to 3000 metres into the air. As the final glacier receded, it left behind a 10-to 30-metre layer of clay till that can still be spotted along most river banks. In the wake of the retreating ice, the seas rushed over the Lowland and deposited a layer of marine clay three to 11 metres thick atop the glacial till. Much, much later came the final soil deposit—a blanket of peat that in some spots reaches a thickness of two metres.

Freed of the weight of glacial ice, the

crust of the Lowland began to rebound. This gradual process of readjustment is not yet over. Near Cape Henrietta Maria, the rate of crustal uplift is estimated at 1.2 metres per century. Polar Bear Provincial Park gains an estimated 7.8 square kilometres every year as the land re-emerges from the sea. Landmarks of the earth's slow readjustment extend far inland across the Lowland. Storm beaches against which water once pounded, bars and strand lines all mark stages in this process.

Near Sutton and Hawley Lakes stand rows of stony outcrops that stretch 150 to 180 metres above the plain. Here and there, an isolated knob reaches a height of 275 metres. But these formations are the exceptions to the rule. They merely accentuate the flatness of the Lowland as it sweeps gradually downward from its natural border, the Precambrian Shield, to the low coasts of the sea.

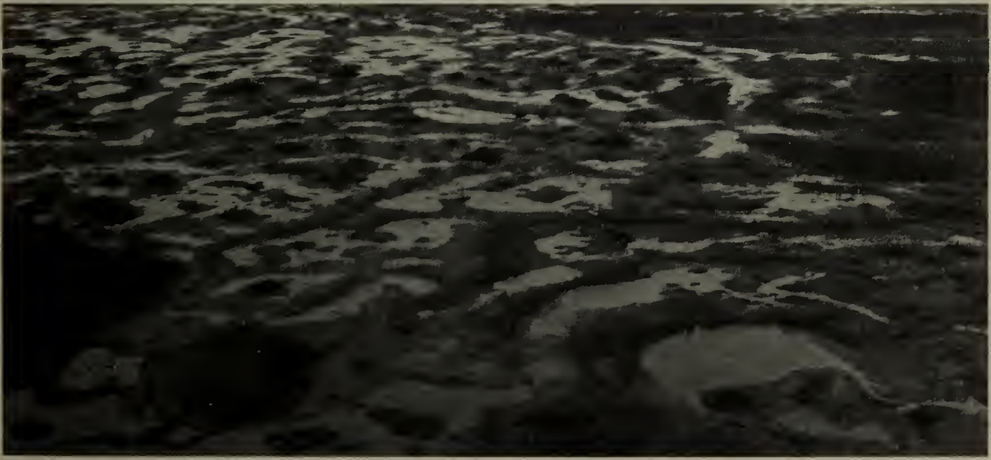
What gives this landscape much of its surprising variety is the plant life it supports, for the Lowland contains three distinctive physiographic regions—the Region of Continuous Permafrost, the Region of Discontinuous Permafrost, and the Coastal Zone.

The most southerly example of continuous permafrost in all of Canada is the area around Cape Henrietta Maria near the north end of James Bay. The arctic tundra here sports a mixture of arctic and boreal vegetation. There are expanses of lichen and low shrub peat plateaux, tundra where peat depths rarely reach 30 centimetres, and coastal fens with small, slightly raised mounds of peat known as *palsas*.

The most southerly limit of discontinuous permafrost lies at the south end of James Bay near the community of Moosonee. Here one finds a mosaic of forest tundra, lichen heath, fens, bogs, and black spruce forest perched atop raised bogs. The plant life that typifies a bog differs from that of a fen for several reasons, but principally because fens get much of their moisture from underground while bogs get most of theirs from rain and surface drainage. Whereas a visitor to a Lowland bog would find black spruce, sphagnum moss and ground lichen, a visitor to a fen would discover sedges, dwarf birch shrubs and stunted tamaracks.

The coastal zone that borders the waters of James and Hudson Bays is about 1150 kilometres long, and from one to 85 kilometres wide. Coastal sedge meadows and more mature peatland define its western perimeter. Where the beach strand lines and spits are still washed by occasional flood tides, no plants grow. Further inland, on the relic beaches, black spruce and lichen woodlands have sprung up. Between these two areas is a carpet of goose grass.

The Hudson Bay Lowland has many claims to fame in addition to its importance as habitat for many thousands of summering birds. Flat and swampy though it is, to the people who live here it is beautiful. And to those of us with a special interest in physiography, it is also a breathtaking natural record of ecological changes both ancient and ongoing. ■



*The muskeg is a mosaic of bogs and fens. Photo by J. P. Prevett.*

# Wildlife management on the great muskeg: a brief history

by A. J. Stewart
*former District Manager, Moosonee*

VAST and remote, harsh and unpredictable, the Hudson Bay Lowland makes wildlife management a difficult business even at the best of times. Against this forbidding yet enticing backdrop of bog, fen, tundra and vast tidal flat, wildlife managers continue a drama begun almost half a century ago. What brought the first wildlife specialists to the Lowland, and their accomplishments, are the subjects of this short history.

It all began in the late 1930s, when a rapid decrease in the Lowland's population of beaver *(Castor canadensis)* became apparent. No one knows exactly what happened, though heavy trapping to satisfy an increased market and outbreaks of the bacterial disease, tularemia, are likely suspects. Whatever the causes, conservation was clearly required. Dr. W. L. Tyrer, then the Indian agent at Moose Factory, approached what was then the Department of Game and Fisheries with a proposal for the creation of a fur preserve.

Dr. Tyrer's successor, Dr. T. J. Oxford, saw the idea realized in 1941. Backed by the district's Cree residents, he brought the Kesagami Beaver and Fur Preserve into being. Four years later, H. R. Conn of the Department of Indian Affairs called the preserve a co-operative, tri-lateral agreement, with "the province supplying the land, the Dominion putting up the capital, and the Indians doing the work . . . ."

It was in fact Cree Indians, most of them heads of families, who did much of the original conservation work. These men located and counted the beaver lodges on the traplines traditionally used by their extended families, so that trapping pressure could be adjusted in accordance with the size of the beaver population. In return for protecting the resource, these "tallymen" received an annual sum of money. And they were given number-stamped metal tokens for each lodge they marked as symbols of their beaver wealth.

*An oldtimer examines the pelt of a marten, a furbearer once scarce but now thriving in the Lowland. Staff photo.*

To give the population an added boost, the department and the Hudson Bay Company joined forces to import beaver live-trapped in such places as Algonquin Park. Between 1942 and 1945, 146 animals were released around James Bay. Out of this period came the Cree term *Ahmisk Hookimaw,* or "beaver boss"—a name to which ministry employees in Moosonee District still respond.

These first management efforts appear to have been effective. Conn recorded that the number of known lodges increased from 700 to 1,180 between 1942 and 1945. Today, as the 1980-81 harvest of 3,718 pelts suggests, the Lowland beaver population thrives.

Transplants had worked so well on beaver that other furbearers were occasionally imported. "In February 1957," wrote Lands and Forests' Andy Gagnon in a 1958 report, "13 fisher . . . were planted approximately 36 miles northwest of Lake River Post.'' But fisher *(Martes pennanti)* had never been plentiful in the Lowland, and they must have had their reasons. The numbers taken today remain negligible.

A much more successful transplant had occurred just a few years earlier. While the beaver population was being rebuilt, marten *(Martes americana)* were steadily disappearing and by 1951 had all but vanished from the Lowland. The importation of 126 marten from Chapleau brought about steady improvements on which the department's Harry Lumsden could report with satisfaction in 1957. To today's Lowland trappers, marten pelts are big business. The 1980-81 harvest of 3,750 tells its own story.

Some of the northland's furbearers appear to have prospered without direct assistance. Polar bears *(Ursus maritimus)* have been the objects of a yearly census since 1963. That year, as Rod Standfield and George Kolenosky flew along the coastline counting the bears for Wildlife Research Branch, they spotted only 70. Current estimates place the coastal polar bear population at about 400.

To today's sportsman, the Lowland is a kind of goose-hunter's mecca. But though the Cree had long been aware of its importance to migratory birds, it was not until the late 1940s that wildlife managers began to give the area serious attention.

Dr. Harold Hanson of the Illinois Natural History Survey was among the first biologists to document the coastal breeding sites of geese. Cape Henrietta Maria, where 100 breeding pairs of lesser snow geese *(Anser caerulescens)* had been spotted a few years earlier, attracted his attention in 1947. Hanson wrote to Dr. C. H. D. Clarke, then the department's Wildlife Management Supervisor, expressing his desire ''to fly over [the Cape] and Akimiski Island to see if blue and snow geese nest there in colonies.''

This marked the beginning of a process that would bring Cape Henrietta Maria, now famous as the nesting site of 110,000 snows, within the borders of Polar Bear Provincial Park. Established in 1970, this 24,087-square-kilometre park protects geese and other wildlife by permitting non-natives to hunt from only two licensed camps there.

Hanson's interest also marked the beginning of waterfowl research that continues in Moosonee today. The intensive surveys of

*Continued on page 8*

*The late Cam Currie at a meeting of Lowland trappers in the 1950s. Photo by Mr. Boultbee.*

*Continued from page 7*

Tennessee Valley and Mississippi Valley flyway geese done each year represent part of Ontario's commitment to continental waterfowl management. During the 1940s and 1950s, vital pieces were added to the management puzzle by Hanson and such department staffers as Lumsden, who continued to collect and refine their data until they could identify discreet flocks.

When parts of the Mississippi Valley flyway in the United States were closed to Canada goose hunting in 1946 and concerns were expressed over the numbers taken by Lowland coastal Cree, attempts were begun to measure that harvest. Hanson and Lands and Forests' W. C. (Cam) Currie placed it at 4,600 annually in 1947. More detailed surveys in 1954 raised the estimate to 8,400 Canadas. These surveys of kills by coastal Cree still go on, and current estimates place the yearly harvest of Canadas, snow geese and various species of ducks at 75,000. But in spite of these large harvests, the Canadas have proliferated just as the snow geese of Cape Henrietta Maria have done. This is due largely to the highly successful American wintering sanctuaries, an overall reduction in hunting pressure, and the increased amounts of standing grain left by American farmers as large-scale cash-cropping has become common.

Like today's ministry staff, early researchers emphasized the tremendous importance of geese to the culture of the Lowland Cree. In a 1957 report, Hanson and Currie quote a story told by Bishop Robert J. Renison of an early spring funeral procession that took place during his first years at Fort Albany.

As the mourners approached the graveyard, "suddenly the cry of wild geese was heard. The funeral procession stood still, and from all over the settlement came the answering call from every living soul.... A great flock of Canada grey geese swept like a gigantic airplane over the trees rejoicing at what seemed a welcoming call. The phalanx turned to leeward and sailed slowly down over the spot from which the sounds came. It was too much even for sorrow and decorum. The chief mourner dived into his tent and appeared in a moment with his loaded gun. With incredible ease and grace, he brought down a goose with each barrel. Cheers and laughter rang out. The oldest instinct of man triumphed in every simple heart, and, as the pallbearers patted the bereaved husband on the back, he modestly replied like a true sportsman, 'She did it. I always had luck when she was with me.' "

The Cree's reliance on geese is also indicated by the ways in which they have participated in management activities. During the early years of government involvement in the Lowland, the people of Moosonee and Moose Factory requested and were granted bird sanctuaries at Long Point at the mouth of the Moose River, and on Shipsands Island. "They feel," Gagnon reported, that "if these two places are closed, and the geese are left to feed as they did years ago, the hunting and the amount of geese will bring back old memories."

The Lowland waterfowl have benefited the Cree in more than one way. In a 1959 report, Lands and Forests' T. Batchelor and Earl Stone recommended that "small outpost camps for duck and goose hunting in the fall, in remote areas below the 54th [parallel]...would help to extend the summer [tourist] trade for a few weeks."

Indeed they did! Goose hunting camps now number 12 along the coastline and represent a major source of tourist revenue and employment—200 to 300 Cree find work in the camps during the hunting season. Through a joint federal-provincial resource-management program, the Ministry has helped the Cree set up and operate these camps. The goal is to have each one owned and operated by native people.

Not all programs undertaken by Lowland wildlife managers have succeeded. A salmon-stocking program of the early 1960s was ill-fated, and the once-famous Hawley Lake trout fishery has declined. We still know little about Lowland caribou *(Rangifer tarandus).* And mercury has been found in Moose River fish.

With the modern world standing at the Lowland's doorstep, many changes, both good and bad, can be expected. But the ministry staff in Moosonee District look forward to meeting the challenges of the future with the same fervor that inspired the pioneers of wildlife management who travelled, worked and lived on the great muskeg. ■

*Snow geese streaming into a banding pen at Cape Henrietta Maria—an avian assembly line. Photo by F. Johnson.*

# The great goose factory

by J. P. Prevett
*Regional Waterfowl Specialist*

THE vast and isolated Hudson Bay Lowland is an ecosystem of paramount importance to the geese of eastern North America. All told, about 4.5 million geese visit the Lowland every year. Most stop for a few weeks on the coastal marshes of James and Hudson Bays before heading on to more northerly breeding grounds. But more than three-quarters of a million stay on to nest and rear their young in the immense inland muskeg and northern coastal tundra.

To more than half a million Canada geese *(Branta canadensis),* the Lowland's interior muskeg is a summer home. On this seemingly limitless expanse of sodden peat grow stunted tamarack and spruce and a variety of shrubs and herbs. Small bodies of water are dispersed in clusters throughout the muskeg, forming a complex array of bogs and fens. It is here that nesting is concentrated.

The Canadas begin to arrive at southern James Bay in early April, and by month's end have occupied the entire area. At the first sign of spring melt, they hurry to inland nesting territories. Eggs are laid as the first patches of suitable fen and bog habitat appear through the snow.

If the thaw is late, however, the geese congregate near open water along rivers and the coasts of James and Hudson Bays, awaiting a break in the weather. This delays their dispersion to inland nesting areas, where the almost impassable muskeg protects them from hunters. Thus, a late spring means a larger-than-average kill by the Cree.

It is easy to see why the Cree are always eager to savor the first spring goose of the year, for the birds hit their peak weight just before they reach their breeding grounds. One-third of that weight is composed of stored fat accumulated further south during the spring migration. This fat, along with reserves of protein, tides them over the lean period before grasses and sedges begin to sprout.

These reserves must also supply the nutrients required for egg formation, so a late spring has another important effect on the goose population. The more reserves the birds must use to maintain themselves

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*Wavies come in two color phases—blue and snow—and often interbreed. Photo by J. P. Prevett.*

*Continued from page 9*

before nesting, the less are available for reproduction. Clutches are smaller and the number of young hatched lower when spring is slow to arrive. Because of this reliance on stored reserves, reproductive success among northern geese often depends significantly on food supplies encountered far from the nesting grounds.

Delayed springs can affect reproductive success in another way. They may cause the Canadas to begin domestic life before their favorite inland nesting sites are protected by moats of melt-water. This gives timber wolves *(Canis lupis)* and red and arctic foxes *(Vulpes vulpes* and *Alopex lagopus)* ready access, and more clutches than usual are wiped out.

The geese get only one chance at raising a brood. If a nest is destroyed, the female has too little time to form more eggs and complete the nesting cycle before the end of the short northern summer.

In addition to housing Canada geese, the Lowland is the site of the world's southernmost nesting colony of lesser snow geese *(Anser caerulescens)*. Unlike Canadas, which disperse throughout all suitable nesting habitat, the snows prefer plenty of company while they go about the business of reproduction. The Cape Henrietta Maria colony looks like a sprawling, noisy barnyard. It smells like one, too. Early in the nesting cycle, the colony often seems a place of total disorder as donnybrooks between ganders from adjacent nests break out on all sides.

The snow goose colony at the Cape was first visited by biologists in 1944, when only 100 pairs were seen. By 1973, there were an estimated 30,000 pairs. In the next six years, the population nearly doubled, reaching 55,000 breeding pairs.

Why the snows choose this particular spot for nesting is unclear. There would seem to be ample suitable habitat adjacent to the site, as well as at other locations along the Hudson Bay coast. The phenomenal growth of this colony is cause for concern, since overpopulation can result in the destruction of the brood-rearing habitat. Overgrazing is suspected at another large and rapidly growing colony of snows located in the Northwest Territories. Because of the potential for overgrazing at Cape Henrietta Maria, and the harmful effects this could have on the snow goose population, developments there warrant close attention.

In addition to its role as a breeding ground, the Hudson Bay Lowland is a vital staging area. Here, geese in transit between nesting and wintering areas can stop for food and rest.

Between two and three million snow geese and about 200,000 of the small-bodied races of Canada geese congregate in the extensive coastal marshes around Hudson and James Bays during spring and fall. At these seasons, the larger Canadas that nest in the interior join the crowd along the coast. Atlantic brant *(Branta bernicla hrota)* also stage in the Lowland during their spring and fall migrations, but they frequent the intertidal flats where beds of their favorite food, eel grass, grow.

To human eyes, the coastal marshes look inhospitable when the snow geese turn up in spring. Ice and snow still blanket much of the area. Yet the birds gain weight during their stay. They probe the mud with their strong bills, pulling up roots and the underground storage organs of marsh plants. These subterranean warehouses are particularly rich in nutrients just before the marsh plants begin their spring surge of growth. Thus, the Lowland plays a critical role in allowing the snows to recover fat and protein used up during their northward journey.

The early spring meals provided by the

*Continued on page 24*

*Officers Fred Johnson and Pat Brown on patrol, Sutton River, 1979. Photo by W. A. Hutchison.*

# Patrolling the great muskeg

by W. P. Brown
*Conservation Officer*

*WE are flying north by helicopter, 250 metres above an endless expanse of stunted tamarack. The ground beneath us is a vast plain of water-saturated peat dotted with countless bog ponds and small lakes. We are 400 kilometres from home, and we have 300 kilometres to go before we reach Fort Severn, the most northerly community in Ontario. Already we have passed through sun, fog, rain and the first few snowflakes of fall. The waterfowl season opens tomorrow, and the conservation officers of Moosonee are on patrol . . . .*

In early fall, excellent trout fishing and goose hunting draw a great many sportsmen to camps scattered throughout the northern part of the vast District of Moosonee. All of these camps are owned or managed by Cree Indians, some of the 5,000 native inhabitants of this immense land with its 1,000-kilometre northern coastline. Seeing that the fish and game laws are obeyed by the guests at each of these isolated camps is up to Fred Johnson and myself—the only two conservation officers in the whole of Moosonee.

Travel is limited to chartered or ministry-owned aircraft. Many areas lack suitable landing sites. Fuel is scarce. The weather along the coast is always changing, usually from bad to worse and back again. All of these factors limit what we can accomplish.

To circumvent at least a few of these difficulties, we decided to charter a helicopter for the three-day patrol we had scheduled for early September, 1979. This is the story of that patrol.

Sunday dawned cool and grey and rain threatened as we prepared to depart. Our supplies completely filled the back of our Hughes 500. There were packsacks, brief-

*Continued on page 14*

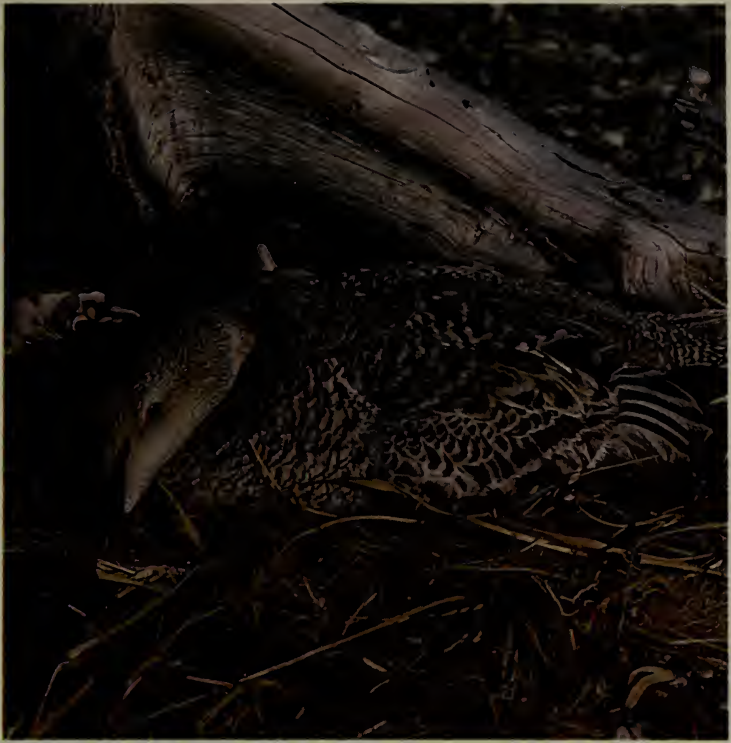
*Snowy owl. Photo by J. P. Prevett.*

*Arctic tern. Photo by F. Johns*

# Birds of the Hu

*Golden plover. Photo by J. P. Prevett.*

*Ptarmigan. Photo by J. P. Pr*



Female common eider on nest. Photo by F. Johnson.

## n Bay Lowland

Great grey owl. Photo by J. P. Prevett.

*Continued from page 11*

cases, sleeping bags, food, a fuel pump, and an extra hundred litres of gas for those long stretches between fuel caches. Fred and I had to cram ourselves into the front of the helicopter, crowding our pilot, Andy Rowe.

The first leg of the trip was long and uneventful, and the weather slowly grew worse as we flew north. We made our first refueling stop at Attiwapiskat, 240 kilometres north of our starting point at Moosonee.

About 45 minutes later, we landed for lunch at Lake River Post near the mouth of the Lakitusaki River. This former Hudson Bay Company post was abandoned almost 20 years ago. We explored the empty church, where we found a pump organ from which a few squeeks could still be coaxed. It spoke mutedly of a time when the post was the social and commercial centre for a few Cree families sprinkled throughout the Cape Henrietta Maria area. In the deserted company store, old bills and receipts littered the floor. By the time we had peered into the vacant warehouse and the old manager's residence, we could almost feel the ghosts.

A short flight took us to Site 415, our second fuel stop. This was once a radar-tracking station, part of the Mid-Canada Line that operated during the late 1950s and early 1960s. Now the site is one of the designated access points to Polar Bear Provincial Park. Some day it may be the park's headquarters.

Only a few ptarmigan were disturbed by our intrusion. They fluttered away as we landed, clucking their disapproval. Site 415 is out on the tundra, and the chilling rain and wind off Hudson Bay cut through our clothing as we quickly pumped fuel.

On the way to Hawley Lake, where we would spend the night, we set down at an outpost camp on Sutton Lake to check three anglers. Their surprised faces told us that they were probably more used to seeing conservation officers climb out of a green and white vehicle or a bright yellow airplane. After the ritual of small talk, we checked their licences and counted their fish, warning them not to hunt geese in Polar Bear Park unless they stayed at one of the two organized camps there.

A short hop took us to our Hawley Lake camp. Albert Chookomolin, who operates a tourist camp about two kilometres up the lake, dropped by for an after-supper visit. He brought along a gillnet he had found at Sutton Lake a few weeks back after a party of fishermen had left. Albert didn't know the men's names. We promised to investigate.

We woke up Monday morning to find fog hanging in the trees. This gave us time for a leisurely breakfast in the cabin, and it wasn't until 9:30 that the sky was clear enough for us to start for Winisk. From there, we would follow the coast to Fort Severn.

Doug Sayers was on hand to meet us as we alighted at Fort Severn. As the Regional Indian Liaison Officer from Sioux Lookout, Doug had come to help the local camp owner open his doors and greet the first hunting party due the following afternoon.

Sixty kilometres westward, we hovered over the Niskibi River. Unable to spot any private hunting parties, we began our return to Fort Severn. Just east of our goal, we spied a remarkable beast that seemed to combine the rump of a polar bear with the head of a seal. Drawing closer, we saw that the bear had been so absorbed in his meal that he had buried himself to the shoulders in the seal's carcass. The hungry animal showed no desire to share his lunch with us—in fact, the angry gestures he made at the strange whirligig in the sky were downright rude.

A little further on, we decided to drop in on Tobius Hunter, who runs a commercial hunting camp at the mouth of the Shagamu River. In his hesitant English, Toby told us he had no guests, but ''maybe next week.'' When we left, we had Toby's outbound mail with us. He would pick up the replies when he returned to Fort Severn at Christmas. Toby, his wife and their son still live by the old ways, making their home along the coast, and going to Fort Severn only for supplies and short visits with friends. They survive by hunting, fishing, trapping, and catering to the few sportsmen who discover the isolated camp.

We arrived back at Winisk just in time for supper and, hunger satisfied, headed east to Joe Chookomolin's camp at the mouth of the Sutton River. There we checked four men who were trout fishing

*Refuelling on a frozen lake. Photo by W. A. Hutchison.*

while awaiting the opening of the goose hunt the next day. Then it was back to Winisk for some welcome sleep.

On day three, our Senior Lands Technician and the health inspector came up from Moosonee to do some lands inspections. They needed our helicopter, so we stayed on the ground and spent some time helping to load a ministry Otter aircraft that had been sent as part of the Resource Development Trapper Assistance Program. Later, we gave the manager and guides at Winisk's goose camp some lessons in the dos and don'ts of the Migratory Birds Convention Act and the Game and Fish Act, and their Regulations. They would pass the instructions on to their guests.

Our day on the ground added a fourth day to our patrolling schedule. We began by revisiting the Shagamu River camp. The cool, foggy weather held, and so did our results—still no hunters. Back at Winisk, as we prepared to return to Moosonee by way of Cape Henrietta Maria, a private executive jet arrived with six American hunters. We checked the licences of the camp's first guests and wished them a good hunt.

Stopping at the Sutton River camp on our way south, we found one party of three hunters at their cabin. Fred checked inside and under the foundation and came up with 29 brook trout—14 over the legal limit for three people. After completing the paperwork and warning the camp owner to be more vigilant, we sped off toward the Kinusheo River.

There we found two aircraft, a party of six men from southern Ontario—and more problems. Four of the men had firearms, and several ptarmigan were stewing in the pot. All four confessed to hunting in Polar Bear Park, and the guns and game we seized were added to our already-bulging load. Strong headwinds made for an unusually long flight home, punctuated by only two fuel stops. When we finally reached Moosonee, we cleaned, tagged and stored the articles we had seized. It was 9:00 p.m. before we called it a day.

During our four days out, we had travelled more than 2,500 kilometres, made 33 contacts, laid five charges and issued one warning. We had covered some of the most remote and desolate real estate in Ontario, and had brought the law to some people who never expected to encounter it. ■

# The Lowland brook trout story

by B. R. Zalewski and J. B. Weir
*Biologists*

THERE are moments in a biologist's life when he wonders whether the creature he is devoting his energies to is really worth the trouble.

We had such a moment back in the summer of 1978, as we lurched and rolled 13 kilometres out to sea in an outboard canoe. We were looking for the entrance to the Wapiskau River halfway between the Moose and Albany Rivers on the southwest corner of James Bay, and we had gone far out to avoid the deadly shoals and reefs. We scanned the distant coastline for the landmarks an Indian guide had told us of, the two tall trees that had been sheared of lower branches so that their bushy crowns stood out in stark relief. Without them we didn't stand a chance of reaching our goal. From time to time during our 10-hour journey, we risked a backward glance at what trailed behind us on a straining rope—an aluminum jet boat designed to travel in just five centimetres of water. It was a lot deeper than that where we were, and the huge swells that pounded and tossed our canoe seemed determined to show us just how deep it was.

This was the harrowing start of our two-year study on the Wapiskau. What had lured us to that isolated spot was a streak of silver with blue and crimson beauty spots, known in scientific circles as *Salvelinus fontinalis* and among fishermen as the brook or speckled trout.

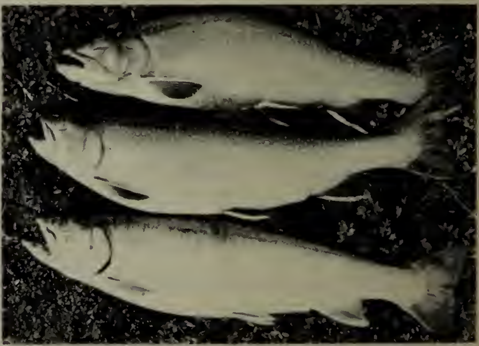
A favorite among freshwater anglers, the brookie has been successfully introduced to waters all over the world. It ranges over most of northeastern North America, and inhabits most of Ontario's cool, clear streams and lakes. The filigree network of creeks and rivers that trickles over the Hudson Bay Lowland has some of the best brook trout fishing in the province. That makes the Lowland waters important not just to the locals, but also to sport fishermen from the south who might be enticed to spend their tourist dollars here in Moosonee District.

The brook trout around Hudson and James Bays make frequent jaunts between fresh and salt water. They can't tolerate the high salt levels of the open sea, but they thrive in the brackish waters of the bays, which receive abundant discharges of fresh water. Tests of James Bay have shown it to be roughly one-half to two-thirds as salty as sea water. In their marine environments, the brookies can find plenty of capelin *(Mallotus villosus),* forage fish and invertebrates to eat.

We were out to study this sea-run phenomenon in a typical Lowland watershed. We wanted to pinpoint the trout's travel patterns and, in particular, to resolve a debate over the times and extent of their movements between fresh and salt water. This would mean setting up a fish fence across the Wapiskau to block passage and let us tag and monitor the brookies.

When we reached our campsite, the river was a mere trickle. But we pitched our 3.7-by-4.3-metre tent on a raised beach ridge to avoid the high tides we knew would come. This small structure would house up to five people who would have to keep their elbows and their tempers under control for almost four months.

The materials for our fish fence had been brought to the site by snowmobile during the winter. Before long, we had stretched the welded wire mesh from bank to bank and nailed it to wooden pillars attached to snow-fence stakes driven deep into the ground. Any passers-by would be propelled



*Sea-run brookies (bottom) and resident trout (top two) vary in color and shape. Photo by J. P. Prevett.*

by the current into the traps along our W-shaped barricade.

To round out our picture of brook trout life, we set groups of experimental gill-nets offshore in James Bay. In addition to telling us more about brookie biology, these might help us to determine the feasibility of a commercial fishery in these waters. We did not expect that, as our catch lay dead in the nets, armies of "sea maggots" (amphipods) would invade through gill, vent and mouth to reduce fine one-kilogram fish to near skeletons within a day. Nor did we expect that the sudden storms on the bay would keep us from our nets for days at a time, spoiling them and their contents.

Our gill-net results were not the only surprises of that first summer. As our vigil at the fence continued, we were increasingly perplexed as few candidates for tagging appeared. We spent a desultory hour each day tossing away the debris that lodged in the 2.5-centimetre holes of the mesh. Finally, near the end of September, large numbers of brookies began descending the rising river. With them in the rushing 1.2-metre waters came a constant traffic of leaves, branches and tree trunks. At the end, we were frantically splashing in the frigid waters every three hours, protected by waders and wet suits. A gas lantern let us work through the cold nights.

Frustration overtook us one October day as high tides brought an onslaught of debris that crushed our fence. More fish than we could possibly tag surged around us. When the water rose over the tops of our waders we were forced to give up. Then the tide dropped, and the retreating water took our fence and our hopes for that year's study. The 50 fish we had tagged were mainly post-spawners, probably seeking a place to winter in the lower reaches of the Wapiskau.

We had answered a few of our questions, but many remained. When did the trout enter the river? Was the limited upstream movement normal?

When we returned the following June, we were accompanied by Miro Laufa, an exchange biologist from Papua New Guinea. The sub-arctic spring was a chilling experience for one accustomed to a year-round 25° Celsius, but when it came time for mosquitoes and moose flies Miro was unimpressed. "At home they're hungrier," he said, as the rest of us bathed in repellent.

Our second try at the James Bay gill-nets confirmed what we had learned the previous year. We decided that live-trapping in trawl or trap nets would be a better bet for any future experiments. But we had learned something interesting about the brookies' movements in marine habitat. Our nets had gilled either several fish at once or none at all, and this suggested that they tended to travel the bay in schools.

Back at the fish fence, things went as slowly as in 1978. During the hottest part of the season, we did well to tag a fish a day. The brookies were apparently beating the heat by moving to cool streams and headwaters. In early September, a modest upstream movement put our tagging teams into action. Later that month, as water levels rose and temperatures dropped, a pronounced downstream movement began. As the migration to the sea continued, we tagged 70 fish.

Then, in spite of the reinforcements we had taken the precaution of adding after last year's disappointment, the fence again gave way.

As we toasted the job's end with hot, rum-laced coffee, we discussed what we had learned from our study on the Wapiskau. It appeared that some of the brook trout we had tagged on their way upstream stay in the river all year, returning to its lower reaches to find wintering habitat after spawning. A few brookies may come from James Bay when tides lift them over the extensive flats and up to the Wapiskau, returning to their marine homes only after spring break-up.

But why had there been so few brookies travelling upstream for two spawning seasons in a row? The pattern suggested that the trout lacked a clear channel to carry them over the flats to the river in September. At low tide, the flats in the region are two kilometres wide and water fans out over them in a broad, shallow flow. Few trout would be likely to make it through these waters, only centimetres deep in most spots.

We theorized that those brook trout that leave the Wapiskau and many of its neighboring streams in spring are forced to

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*Attiwapiskat's Emile Nakogee poses in his rabbit skin coat with the day's bag of Canada geese. Photo by J. P. Prevett.*

# A year with a Cree hunting family

by J. P. Prevett
*Regional Waterfowl Specialist*

IT is spring, and the rivers are still frozen. The coastline is silent except for the drone of the snowmobiles that have long substituted for dog teams. The elder stands by the sled in which his wife and their belongings are stowed away. Two sons, a son-in-law and their families complete the travelling party of 18. They are ready to leave their village and make their way over the shore ice to their traditional goose hunt camp.

Nowhere in Ontario—perhaps nowhere in North America—do native people still rely so heavily on wild animals for food and income as here in the Hudson Bay Lowland. The life-style of the Cree has changed in many ways since the early days of the fur trade, and the pace of change has quickened over the past quarter-century. There are now more people in the villages than in family bush camps. Many now work for wages at least part of the year. Schooling has become more important. Modern air transportation, snowmobiles and outboard motors, are available to everyone. Radio and television signals are beamed into most villages. Yet, in most communities, hunting, fishing and trapping remain fundamental, and many families still live part of the year in the bush.

The elder's family reaches their spring camp to find their living quarters ready. The men have been here earlier in the season to erect the tents, rechink the log-and-moss *eskigan* that serves as the main living quarters, and lay in supplies. Two freighter canoes with outboard motors stand on racks above the flood line, waiting for the return trip that is still two months off.

As the family settles in, the elder runs the show, directing most activities by example. He estimates that it will be a week before the *Niska*—Canada geese *(Branta canadensis)*—begin to fill the sky. In the meantime, the men keep busy, adding to the firewood supply, setting rabbit snares and owl traps, and making goose decoys from spruce logs. Perhaps they will also scout for moose *(Alces alces)* and caribou *(Rangifer tarandus)*. The women set up house, look after the kids, clean the game and prepare the food. And everyone listens for the first faint honks that signal the coming of the Niska.

At last, the tension snaps. The geese come streaming back to their ancestral breeding ground. There are more this year than ever before, thanks to the management efforts of conservation agencies in Canada and the United States. Spirits are high as birds are brought back to camp for the first feast of spring. Traditionally, this was the high point of the year, a time of celebration after the long winter when everyone knew periods of hunger.

For the next month, the men do little but hunt. Only the foulest weather keeps them in camp. Even when bad weather augers a poor hunt, they usually spend the whole day in the blind.

The women, too, are busy. They pluck and preserve the geese, using a variety of methods but always incorporating the smoking process. Entrails, fat, feathers, and the succulent meat—everything is put to use. Visiting the camp, I walk into the eskigan and peer into the pot on the fire. Skinned goose heads, eyes and brains still intact, bubble around and around.

The hunters always harvest faster than the women can process. The backlog is hung in an old eskigan packed with several centimetres of snow. This cooler will preserve the untreated geese well into the summer.

While weather conditions permit, the hunters may take some birds back to the village freezer. Many others are distributed to relatives who, for whatever reason, have not come on the hunt. Later on, when ground travel is impossible, the hunters may charter a helicopter to take the birds back to the village and return to camp. Sometimes friends and relatives come out from the village to get in a few days' hunting, or drop by for a visit from neighboring camps.

Just when the flights of Canada geese have tapered off, the *way-hay-ow* appear. These are the snow geese or "wavies" *(Anser caerulescens)*, bound for their arctic breeding grounds. Full-scale hunting resumes. Whether the wavies stop over in the Lowland or press on past the hunt camps depends on the stage of the spring melt. When ice and snow disappear early, the harvest is small. But when a late spring forces the birds to wait in the Lowland until the snow further north has melted and

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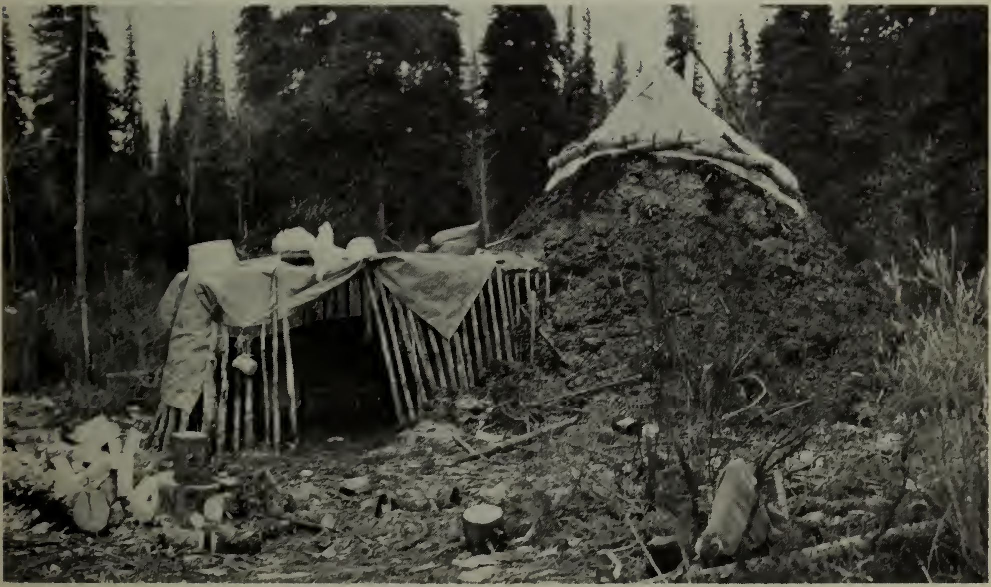

*This log-and-moss eskigan houses a Cree family at their hunting grounds. Photo by J. P. Prevett.*

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nesting can begin, the hunters' tally is high.

By mid-May, the goose hunt is over. The camp may have taken 700 to 800 geese, along with a handful of ducks, sandhill cranes, whistling swans, shorebirds, hawks, owls, grouse, snowshoe hare, and maybe a bear or a moose. Almost every part of each of these animals is used. It is the best time of the year.

Sometime in June, the family returns to their village by freighter canoe. In the days when the villages were large community camps, summer seems to have been the season for leisure and social activities. Today, many of the men take summer jobs in housing construction, small community sawmills, or tourist-guiding operations. Since all of the villages are located on rivers, some men travel upstream to cut next year's firewood and float it down to the settlement. And the women tend their fishing nets, especially during the early summer.

By early September the first flocks of wavies are winging southward along the coast. The family sets off by freighter canoe to the hunt camp used last spring. There they will spend most of September and October, returning just before freeze-up. Their fall harvest will consist mainly of wavies, for most of the Canadas have already left the Lowland.

The fall harvest does not seem to hold the same significance to the Cree as does the spring hunt. In former days, Indians were hired by fur traders to kill geese for the post's winter meat supply. Now, that need is gone and other types of employment keep many from the hunt. This year, the elder's son and a son-in-law are guiding at a commercial goose camp. They will hunt for themselves only when it closes. Other men of the village are still at their seasonal jobs and can hunt only on weekends. A few families hunt very little, choosing instead to follow an older fall custom.

Autumn was traditionally the time for most Cree families to begin a long canoe trip up the rivers to inland trapping grounds. Setting out before freeze-up, they would winter at the family traplines, their isolation relieved only by a Christmas visit to the village for holiday celebrations and supplies.

In these camps, every family member had a job to do. The men trapped, hunted and hauled firewood, and the women and children kept house, prepared pelts and tended fish nets. As is still the case, the mainstay of the winter diet was bush meat—moose, caribou, bear, rabbit, beaver, muskrat, lynx, grouse, preserved goose, and many kinds of fish. Late winters were sometimes marked by severe food shortages. Starvation before spring breakup was not unknown.

Now that the children must go to school, the elder's family no longer spends the whole winter out on the trapline. Instead, some adults remain to keep the children while others make several one-or two-week forays to the lines over the course of the winter. Often, now, the men go out alone. Other village trappers may base their activities around their homes, making short jaunts of one or two days to nearby traplines. These changes have altered the character of winter life, and it will not be until spring brings the Niska back to the coast that the families will revert to the older ways.

There have been many such changes in the lives of the elder's family and those of all Hudson Bay Lowland Cree. Some of these changes have brought problems. For instance, the tendency of trappers to overuse the lines close to home and neglect those further away has sometimes put too much pressure on local furbearer populations, making it necessary for government experts to step in and encourage better resource management. And the exposure of the young people to numerous outside influences has left some of them feeling stranded—like the youth of many native cultures—between two worlds.

Yet, in may respects, the changes the Cree have experienced are changes of style rather than substance. Many of the old ways survive. Modern machines, though they happen to make life more comfortable, are used mainly to further the ancient goal of killing game. And a surprisingly large proportion of the people cling to an earlier outlook and sense of identity. At every season of the year, and especially when the first spring geese come streaming back to the Lowland, the Cree regard themselves as hunters first of all. ■

*Blue and snow geese being herded toward banding pen. Photo by H. Lumsden.*

# Snow goose banding in Ontario's arctic tundra

by F. C. Johnson
*Conservation Officer*

TO some people, July means the arrival of that long-awaited summer vacation. But to the Fish and Wildlife staff of Moosonee District, July means the beginning of some dirty but rewarding work—banding some of the geese that summer in huge colonies at various spots in this northern wilderness.

In July of 1979, the district's banding crew prepared to head 500 kilometres northward into Ontario's arctic tundra to Cape Henrietta Maria, home of the world's southernmost breeding colony of lesser snow geese *(Anser caerulescens).* Our objective: to round up 2,000 geese and give each of them a souvenir—a size 7B U.S. Fish and Wildlife Service band.

Like most banding jobs, this one had really begun early in the year, when planners tackled what seemed like a logistic nightmare. The helicopter had to be chartered, fuel purchased and stationed at the banding site, bands ordered, and equipment checked for readiness. Because of the remoteness of the nesting colony, there could be no turning back from the Cape for some forgotten item. The fate of the operation could depend on a tool as small as a pair of needle-nose pliers. And after the planning came the wondering. Would the weather, normally so inhospitable in this subarctic terrain, co-operate to let us get the job done?

The banding used to be carried out entirely on foot, and an inefficient, time-consuming and exhausting job it was. Two groups of three or four men each would

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head out in opposite directions, forming a large circle about five kilometres in diameter around feeding flocks. The geese would not fly out of the circle because at that time of the year the wing and tail feathers of the adults had not yet grown in after the moult, and the young were not fully fledged. But this handicap never prevents a goose from outrunning a man over short distances in the wet tundra grass, so the banders' approach was always indirect and gradual. Grouping the geese together, rounding up the stragglers and strays, and herding them all into the wire pen was a long, slow battle.

By 1979, helicopters and radios had transformed the banding into a highly efficient operation. As our day began, we set off by air in search of several large, scattered flocks. Once these were spotted, each of the four radio-equipped banders was set down behind his own gaggle of 300 to 400 geese.

During the next ten minutes or so, a mini-stampede took place as the geese tried to escape. But the radioed directions of the pilot hovering overhead helped us cut off each escape route and herd the gaggles into one enormous group.

Slowly we drove this noisy congregation through the wet grass toward a dry gravel beach ridge, where the pilot and two of our crew had earlier set up a semicircular pen of fine cotton mesh. By this time, the geese had become more manageable, their natural fear of man overpowered by hunger. Their great appetites demanded several lunch breaks along the route to their temporary prison.

Finally, we had pushed the hesitant geese into the pen and sealed the opening. We quickly constructed a smaller sub-pen inside. It was here that the action of the next few hours would take place.

This was the critical stage of the operation, at least where the young geese were concerned. If the birds were forced to move around the pen too much, the adults might trample the young. And if the goslings were kept too long without water, they would die.

As small groups of geese were herded into the sub-pen each crew member carried out an assigned task. Two catchers in the sub-pen handed birds to two co-workers, whose job was to classify each according to sex, age and color. There were two dominant color phases—the white "snow" with its black-tipped wings, and the slate-bodied, white-headed "blue." Each classified bird then went to one of the banders, who snapped the appropriate aluminum band on a wriggling leg. Meanwhile, the pilot recorded the bands used, and documented any bands the birds might already be wearing.

By the end of the day, everyone was coated in pungent garments of goose down, excrement and mud, and peppered with scratches and mosquito bites. It wasn't the most pleasant way to finish off a working day, but knowing the contribution we were making to waterfowl management gave us comfort.

The bands we had put on the geese at the Cape, if seen and reported anywhere in North America during the same year, would provide the evidence needed to plot migration routes, gauge times of migration, and pinpoint wintering areas. Such information is essential to the identification of areas that need protection. And over the long term, it can be used along with data from aerial and hunter-kill surveys and from other inventories to create a fairly clear picture of the total population. Knowing how many lesser snow geese we have, which are lost to hunters and which survive, how their distribution changes over time, and even how their social structure operates makes for some highly effective waterfowl management. ■

*The identification band is put in place. Photo by F. Johnson.*

# Moose into mitts

by Steve Anderson
*Outdoor Recreation Technician*

EVERY year, Ontario's successful moose and deer hunters are urged to turn in the hides to the ministry so that they can be used for native handicrafts. In return, the hunters receive blaze orange caps—and, perhaps, a feeling of satisfaction. They know that, instead of going to waste, the hides will be made into leatherwear that will keep the Indians warm on their winter traplines or be sold for extra income.

Collection begins as soon as the hunting season opens. Moose hides are gathered mainly in the ministry's Northern Region, and most deer hides come from the area north of Georgian Bay and east of Superior. Raw and unsalted, the hides are sent to Cochrane south of Moosonee District, where they are refrigerated until about the first of December. By then, it is cool enough to ship the hides by regular boxcar to their northern destination.

Then begins the task of distributing up to 15,000 kilograms of hides averaging about 25 kilograms each. Residents of Moose Factory and the community of Moosonee pick up their free hides at the district office. The Cree living further north—at Fort Severn, Winisk, Attawapiskat, Kasechewan and Fort Albany—must wait for theirs to be lifted in by aircraft. Once the hides arrive, they are claimed on a first-come, first-served basis and the work of curing them and transforming them into useful and marketable products gets under way.

There are probably many variations on the theme, but the traditional method of curing is the one most Cree prefer. Mrs. Theresa Matetawabin uses this recipe.

**Fleshing:** The raw hide is draped hair-side down over a log or stump and a knife or animal leg bone is used to scrape away the meat fragments and fat. Then the hide is flipped over and as much of the hair as possible is scraped away. A good shake gets rid of any loose hairs still clinging to it.

**Soaking:** The hide is rinsed in a tub, then left to soak in clean water so that blood and dirt are removed. It is then draped over a log or laid at an angle on the ground to dry. In bad weather it can be dried inside.

*A Cree child wearing a parka trimmed with arctic fox fur displays mother's handiwork. Photo by W. A. Hutchison.*

**Scraping:** Another scraping removes the last of the meat, blood and hair and makes the hide soft and smooth.

**Washing and drying:** The hide is once more washed and dried. In winter, it can be dried indoors. While it is drying, a tub of water mixed with animal brains, or with soap or lard should brains be unavailable, is prepared. This concoction is boiled, then cooled until lukewarm. The hide is then immersed and both sides spread with the brain mixture. Next it is hung out of the reach of dogs and positioned so that it will dry wrinkle free.

**Smoking:** When the weather co-operates, smoking takes place outside over a dome of bent spruce bows under which a smoky fire has been lit. Care must be taken to prevent scorching or singeing. Both sides of the hide get a turn over the dome until they have the desired smoky smell. This whole process takes only 15 minutes.

If bad weather prevents outdoor smoking, the hide is kept indoors for up to a week, then soaked in water, kneaded until soft, and left overnight. If it remains hard, it must be kneaded and soaked again. It is then wrapped wet around a pole and tightened in place with a smaller stick so that the water is wrung out. After removing

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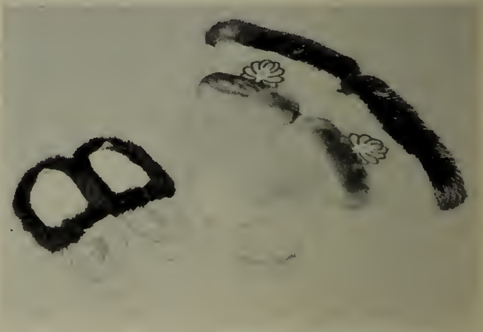
the hide from the pole, two people pull it taut so that all wrinkles disappear. It is then hung up for another scraping on both sides with bone or knife.

**Tanning:** The hide is folded in half and two of its open ends roughly stitched together. A piece of canvas or blanket is stitched around the remaining open end to form a tube. Wood chips of any sort except birch, which burns with too much heat, are set alight in a pail. The hide is hung above the pail and the tube placed around the rim so that smoke rises into the hide. The chips must be doused if they get too hot and care must be taken to see that they do not flame but merely smoke. The hide needs constant watching until the desired shade of light brown is reached. It is then removed from the smoke and continues to darken on its own.

Once cured in this way, the hides are ready to be sewn into mitts, mukluks, slippers and other items, and decorated with duffel, fur and bead work. It is a heavy, tedious task, yet it seems to be a traditionally female occupation.

For a few women, this cottage industry earns a significant part of their annual income. They may market their wares down south, or they may help to staff the summer craft outlet in the community of Moosonee, where tourists can buy directly from the makers. Many other families produce just enough extra leather work to bring in a little spending money. It's up to the individual.

Turning "moose into mitts" means employment and income to the people of the Lowland, but it also means something more. It is a vital part of the Cree culture. ■



*Products of the moose hide distribution program. Staff photo.*

## The great goose factory

*Continued from page 10*

Lowland have an important effect on the reproductive success of the snows. Like Canadas, the female snow geese must be in good physical condition if they are to produce sizable clutches and attend to their incubation.

The Lowland is equally important to the snow geese in autumn. The breeding season in the arctic uses up a good deal of energy. So, before embarking on the long flight to the wintering grounds along the gulf coast of Texas and Louisiana, the geese pause here to rebuild their strength.

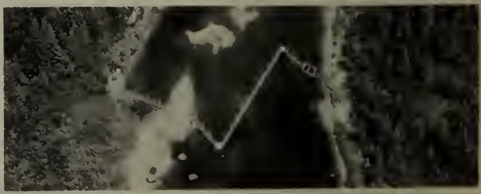
Damp, cold and uninviting as they may appear, the muskeg, tundra and coastal marshes of the Hudson Bay Lowland are crucial to the survival of eastern North America's geese. Its role as breeding ground and spring and fall staging area earns the Lowland the right to be called "the great goose factory." Maintaining the ecological balance of this important habitat is an essential step in ensuring that wild geese will survive to thrill naturalists and sportsmen always. ■

## The Lowland brook trout story

*Continued from page 17*

ascend other river systems with deeper channels when spawning time rolls around. This would mean that the better-equipped rivers are importing brookies from less accessible streams like the one we had investigated. Rivers like the Brant, Sutton and Shagamu, a few of the deep-channelled streams along Hudson Bay that are legendary for their trout fishing, may inherit part of their sea-run populations from such sources. It was an intriguing theory.

In the Hudson Bay Lowland, there's a fish story for every angler. But when those of us from the Wapiskau study talk about the big ones that got away, we have fences—not fishes—in mind. ■



*The fish fence on the Wapiskau before the tides rolled in. Photo by H. Lumsden.*

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